

BOOK REVIEWS

C. M. DUFFUS and J. C. SLAUGHTER: *Seeds and their uses*. IX + 154 pp. ISBN 0 471 27798 3. John Wiley & Sons, Chichester-New York-Brisbane-Toronto, 1980. Price £ 4.95 (Paperback).

Glancing through the book the reader gets the impression that there are hardly any other economic seeds than tropical ones. This observation allured the reviewer to a closer study.

The content of the book is based in part on lectures in applied biology, meant for second and third year courses, attended by students of agriculture, animal nutrition, botany, zoology, genetics, physiology, and crop and animal production.

The book is divided in five chapters: (1) The seed plants, (2) Seed formation, (3) Seed storage and survival, (4) Nutritive value of seeds, and (5) Seed processing.

The first chapter deals with the botany of seed producing crops, mainly cereals and pulses, and the structure of their seeds. The botanical pictures of the crops are for the most part reproduced from Purslove's "Tropical Crops" and are in general too detailed to give an ignorant reader an idea of what a certain crop looks like.

The second chapter on seed formation gives a review on the morphological and biochemical changes which accompany seed maturation. The authors observe that much is known about the developmental characteristics of oilseeds of relatively minor economic importance such as mustard and crambe, while little is known about groundnut and soybean – two of the most popular and economically important. The part devoted to protein deposition in seeds is rather extensive and gives valuable information on the influence of various factors on protein yield and quality.

The chapter on seed storage and survival is brief but it contains the essentials of the subjects.

Many readers will be attracted by the clear way in which the chapter "Nutritive value of seeds" is written. The dietary requirements of humans and farm animals are reviewed in comparison and will be of interest to a wide public.

The greater part of the last chapter is devoted to the processing of cereal grains. Other items are peanut products, cocoa and chocolate, soybean products, mustard, coconuts, coffee, oil and protein.

The book as a whole is an excellent, well documented review of how the properties of seeds are related to their use.

Besides the students mentioned above, the book is also warmly recommended to interested agriculturists, botanists and nutritionists.

G. STARITSKY

I. H. RORISON and Roderick HUNT (Eds.): *Amenity Grassland – An Ecological Perspective*. John Wiley & Sons, Chichester, New York, Brisbane, Toronto 1980, XI + 261 pages, plates, figures, tables. Price £ 19.00. ISBN 0 471 276669.

This book largely consists of the main papers, presented by British authors at a Meeting held in Sheffield in 1978. Its objective was to emphasize the fundamental ecological principles which underlie the establishment and management of amenity grassland (all grassland with recreational, functional or aesthetic value that is not primarily involved in agricultural production), and to identify pressing research needs. In the U.K. this grassland is nowadays recognised as a major national resource but its current annual cost should be minimized.

The comprehensive chapters include breeding and selection of grasses, physical and chemical components of soil environment, and use and maintenance of grasslands of various types.

The idea to outline the ecological perspectives of all amenity grass-categories is most valuable. The general knowledge of the intensively managed areas as sports turfs and lawns is already most

impressing, both inside and outside the U.K. Therefore, the specialists in this field, being forced to walk in the path of ecology, arrived at some outstanding syntheses.

In the great areas of natural reserves, country parks and road verges the maintenance of high species diversity in the sward may have priority, but here the objectives of vegetation management are not very specific. Considering that most professional studies in this field are of more recent date, it is not surprising that the contributions on extensive grassland show the character of analyses or of provisional operating instructions, respectively. Vegetation management is not yet quite a predictive science!

In this book gaps and missing themes (e.g. how grasses grow, diseases of grasses) can be indicated. Leaving out these minor imperfections, 'Amenity Grassland' should be considered as an excellent compilation of lectures, worth reading through not only by workers in the U.K. but just as well by researchers from the continent who are engaged in similar problems.

J. W. MINDERHOUD

L. R. BATRA (editor): *Insect-Fungus Symbiosis. Nutrition, Mutualism, and Commensalism*. Allanheld, Osmun & Co., Montclair; John Wiley & Sons, New York, Chichester, Brisbane, Toronto, 1979. 276 pp. \$ 16.80.

Among the many symposia of the Second International Mycological Congress which was held at the University of South Florida at Tampa (USA) the symposium on insect-fungus symbiosis attracted particular interest and it is enjoyable that the organisers edited the contributions in this publication. The book contains the following chapters:

The fungi versus the arthropods (H. C. Whisler); Lipids of ambrosia fungi and the life of mutualistic beetles (L. T. Kok); The mutualistic fungi of xyleborini beetles (D. M. Norris); The fungi symbiotic with anobiid beetles (G. Juritz); Fungus-culturing by ants (N. A. Weber); Termite fungus mutualism (L. R. Batra and S. W. T. Batra); The role of fungi in the biology and ecology of woodwasps (Hymenoptera: Siridae) (J. L. Madden and M. P. Coutts); Commensalism of the Trichomycetes (S. T. Moss); The Laboulbeniales and their arthropod hosts (I. I. Tavares); Symbiosis, commensalism and aposymbiosis. Conclusions (L. R. Batra).

The first chapter was not included in the symposia, but is based on a fascinating lecture 'Bugging the molds', which was presented by Dr. H. W. Whisler to a general session at the Tampa congress. The author describes the diversity of the interrelationships between fungi and arthropods, including those forms which are important in view of biological control. Most of the chapters are well written, but two chapters leap to our attention: The contribution by L. R. Batra and S. W. T. Batra on the termite fungus mutualism and S. T. Moss on the Trichomycetes. The latter chapter deals not only with the relation of this fungal group to various arthropods, but also informs us in detail about the morphological features and phylogenetic affinities. The print is clear. Unfortunately some photographs in the first chapter are of low quality.

R. A. SAMSON

E. F. DE VOGEL: *Seedlings of Dicotyledons. Structure, development, types. Descriptions of 150 woody Malesian taxa*. Centre for Agricultural Publishing and Documentation (PUDOC), Wageningen, 1980. Clothbound, 465 p., including 20 coloured plates and 178 line-drawings. Dfl. 150,- excl. BTW.

This book is the result of a 3-year stay of the author in Indonesia where seeds were collected of about half of the Indonesian tree genera and the seedlings grown and observed for periods of 2-26 months.

After an introduction, a glossary, a historical review and a definition of the seedling, the book contains the following chapters: structure, function, and variation of the seedling parts; seedling

classification (in 16 types, 4 of which being split in 2 or 3 subtypes); a list of Malesian woody Dicot genera, with indication of seedling type and seedling literature; classification of the seedling types (mainly a discussion of possible pathways of derivation between the different types and subtypes); seedlings and taxonomy; seedlings ecology; the seedlings project (collecting and nursery practice); descriptions.

The author bases his classification in 16 types on combinations of character expressing the mode of development of the seedling. A practical drawback of such a classification is the long period of observation required. More than half of Malesian wood genera belong to the first (*Macaranga*) type with epigeal green seed-leaves entirely free from testa and/or pericarp.

In the author's conception these seed-leaves are no true cotyledons, but 'paracotyledons' corresponding with the first pair of – opposite – leaves in other seedlings types, with abortion of the true cotyledons. The argumentation of this conception is given in the chapter on classification of the seedling types.

Although this conception has much to commend it, it seems at first sight difficult to accept (as stated on page 60) that seedlings of e.g. Compositae, Cruciferae, Labiatae, Ranunculaceae, Rubiaceae and Umbelliferae all belong to the *Macaranga* type with paracotyledons, whereas the majority of temperate Papilionaceae have food-storing cotyledons developing into green leaf-like organs which would be of a different origin. Another dilemma (mentioned on p. 111) is the occurrence in *Canarium* of both food-storing cotyledons and leaf-like paracotyledons of strikingly similar shape.

However, the author's controversial ideas will certainly stimulate morphological and anatomical research on seeds and seedlings of different types.

This book certainly is an extremely valuable contribution to our knowledge of seedlings, also on account of Moehammad Toha's splendid illustrations.

F. M. MULLER

Th. B. CROAT: *Flora of Barro Colorado Island*. Stanford University Press, Stanford, California, 1978. 943 pp., 533 photographs, 9 graphs, 2 maps. Price: \$ 55,–.

This book, dealing with the flora of the small island Barro Colorado, nearly 16 km² in surface and situated midway in the Panama Canal Zone, contains three parts: Introduction (66 pages), Flora (795 pages) and Reference Material (83 pages). It is the result of ten years of field-work and study and is undoubtedly the most comprehensive taxonomic treatment of a tropical flora ever published.

In the introduction climate, geology and soils are briefly discussed and general information is given on several aspects regarding vegetation and plant geography. In terms of the well-known classification system devised by Beard the oldest forest on the island appears to be intermediate between Evergreen Seasonal Forest and Semi-evergreen Seasonal Forest. In the Holdridge Life Zone System this forest has to be classified as tropical moist forest. The younger forest, result of former clearing, may date from as early as 1880. Superficially the forests seem to be uniform but there proved to be differences with regard to the average height of the canopy and the number of tree strata, 2 layers in the younger and (2–)3 in the older forests. It is conspicuous, however, that species diversity in the younger forest is about the same as in the older forest and is probably increasing very slowly in places where the forest has reached 50–60 years of age. The vegetation of shorelines and marshes, trails and ravines are discussed as well.

A good survey is given of the growth forms of the species present on the island and attention is paid to sexual characters, geographical affinities, changes in the flora in historical and recent times, phenological characteristics, and the history of botanical studies on the flora.

The greater part of this standard work comprises descriptions of the 133 families, 704 genera and 1369 species and infra-specific taxa growing on Barro Colorado Island. Altogether 104 ferns, 2 gymnsperms, 353 monocots and 910 dicots are now known from this small island.

Family descriptions apply to genera and species growing on the island but characteristics of allied taxa are sometimes given in parentheses. Ecological information of a general nature or pertinent to more than one species is inserted in the family description whereas ecological information of a more

detailed nature or pertinent to a particular species follows the species description. It is emphasized that the information given is applicable to the species of Barro Colorado only and that statements are not necessarily relevant to other species or genera occurring elsewhere. Also the available information on the interaction between the plants and animals of the islands is included.

The keys are clear and easy to use in identifying the plants, as was tested by the reviewer. An additional 'key to sterile woody plants', pertaining to some 700 species on the island, is added and enables scientists to make surveys of the forest at any time of the year.

A valuable book that should be used as a model for botanical research in the tropics.

A. L. STOFFERS

R. H. GREEN: *Sampling design and Statistical Methods for Environmental Biologists*. John Wiley & Sons Inc. New York, 1979, 257 pp., £ 12.20.

This book should provide biologists with a guide to the principles and options for sampling and statistical methods for environmental studies. It clearly is not intended as a cookery book guide to methods. The choice of any statistical technique should be preceded by an understanding of the principles when applying those in practice. It is the latter aspect that is especially emphasized.

In the first part ten principles are presented and worked out in relation to sampling and statistical design, hypothesis formulation and testing, all with special reference to ecological data. The second part deals with five broad categories of environmental studies and with the specific decisions that must be made in any environmental study.

The book contains a lot of good, though at times more or less paternal advices. The background assumed is a first course in mathematics, statistics, and ecology at a university level, as well as some experience with ecological field work. I wonder whether this really is sufficient. Usually in a first course in statistics topics like e.g. multivariate analysis of variance are not treated. The reader must have a rough knowledge of all such topics, because the author ranges through almost the complete statistical machinery when illustrating the application of his ten principles and explaining how to overcome the typical difficulties encountered in environmental research.

The order in which various problems are mentioned is sometimes surprising: e.g. in one section one can find a discussion of the statistical problems of working with ratios of random variables and mixtures of distributions, but also what one has to do when a lot of data are missing, or when there are numerical problems with almost singular matrices.

I missed a thorough treatment of how to make an impact statement, if one has only observations of locations where the impact has been executed and locations where this is not the case. Such a situation, where one has no observations before, during and after the impact (so-called longitudinal observations) unfortunately occurs frequently.

I think Green better could have worked out say ten examples in detail: this one never finds in a paper or textbook. Moreover, it is my firm belief that the best way to learn the trade is not to read a book but to work in close cooperation with someone who has much experience.

The extensive list of references and the index will be helpful in practice.

E. MEELIS

H. L. LI, T. S. LIU, T. C. HUANG, T. KOYAMA and CH. E. DEVOL (eds.): *Flora of Taiwan* Vol. IV. Epoch Publ. Co., Taipei, Taiwan, 1978. 994 pages, 373 pl. Price US \$ 35.

The volume offered for a review is one of a series of six (all of which have now appeared) on the vascular flora of Taiwan. Vol. I contains the Pteridophytes and Gymnosperms, volumes II, III and IV cover the Dicotyledons, vol. V the Monocotyledons and vol. VI contains checklists of scientific and Chinese names, together with a bibliography and corrections to the previous volumes. The whole work consists of 5109 pages and gives descriptions of 3577 indigenous and naturalized species in 1360

genera and 228 families. For the latter Engler's system is followed. Of many genera one or more species are illustrated by in all 1653 line-drawings. The general index also lists introduced cultivated plants not treated in the text.

The need for a comprehensive flora of Taiwan has long been felt, since whereas the woody flora is fairly well known thanks to the works of Kanehira, Liu and Li, the knowledge of the herbaceous flora was in a rather chaotic state. Many Chinese and Japanese authors have dealt with parts of the flora in numerous papers scattered over several journals. Most descriptions of new taxa were made without comparison with descriptions and material from outside the island, resulting in many so-called endemics. The appearance of the Flora of Taiwan has for a great deal obviated this state of affairs, although further scrutiny will doubtlessly necessitate more name changes. The authors – with few exceptions all from Taiwan – have understandably not pursued extreme accuracy regarding synonymy and distribution. Anyone attempting a floristic analysis of the Taiwan flora must be well aware of this. To mention just two examples: *Peracarpa* (p. 758) and *Triplostegia* (p. 727) both also occur in Malesia (consistently spelt Malaysia). Some lack of uniformity is unavoidable in a book composed by so many authors working under different conditions, although the editors have made every effort toward evenness. I do not quite see the point of citing selected specimens after each species description, instead I would have preferred more information on ecology, distribution and uses. Printing and other errors are of course to be found – *Callitricheaceae* (p. 436), *Geniostema* (p. 157), *Helwittia* (p. 358), *Radermachia* (p. 617), etc. – but rather than looking for flaws I would like to compliment Prof. Li and his team for achieving a flora of this magnitude in such a short time (vol. I appeared in 1975, vol VI in 1979). It is a most welcome addition to the completed modern floras of this part of the world, alongside those of Java, Japan and Riu Kiu.

An interesting detail is that the final stimulus for the publication of this flora was given by Prof. van Steenis who following a visit to Taiwan in 1966, wrote a warm plea for a herbaceous flora of Taiwan in *Flora Malesiana Bulletin* 1967, p. 1562. Another contribution of the *Rijksherbarium Leiden* is in the form of H. P. Nooteboom's treatment of the *Symplocaceae* in vol. IV.

Paper, printing and binding are of good quality and the price, to European standard, is low.

M. M. J. VAN BALGOOY

Leo J. FRITSCHEN and Lloyd W. GAY (Ed.): *Environmental Instrumentation*. Springer Verlag, Berlin, Heidelberg, New York, 1979. XVI + 216 pages, 66 figs., 37 tables. Price DM 42.–, approx. \$ 23.60.

Knowledge of the environment is not limited to chemical information. More and more biologists, agronomists, physicians and others are interested in physical exchange processes between plants, animals or human beings and their environment. This results in an increasing need of measurements of physical properties of the air, surrounding the objects. But what to measure?

The answer depends on the problem of the scientist. The choice of the instrument is the second problem. A tremendous amount of instruments seems to be available to measure the same thing e.g. the air temperature. But each instrument has its own specifications. The scientist should first derive the desired behaviour of the instrument from his problem. It is therefore an excellent idea of the authors to start the book with a chapter of measurement fundamentals and a second chapter giving a review of physical fundamentals.

Only some basic properties are treated. Successively instruments for measurements of the temperature, soil heat flux, radiation, humidity and moisture, and speed and direction of wind and pressure are extensively discussed. Measurement and data processing of turbulent properties are, however, left out of consideration. Maybe it had been better to pay more attention to the latter subject in the chapters concerning temperature and wind. It might be possible that users without enough knowledge of turbulence are deceived to miss interpretation of the obtained data. The figures and photographs are very clear. Extra tables which generally are not given with the instrument, e.g. for wet bulb depression are also very useful. The survey can be called complete.

It should be emphasized, finally, that thorough knowledge of the physical processes is necessary to

guarantee proper results. The book gives help for a proper instrumentation of physical processes.

It is an excellent book which I will strongly recommend to everybody who performs measurements in the environment.

L. WARTENA

W. G. BEEFTINK (editor): *Vegetation Dynamics*. Dr. W. Junk Publ., The Hague, Boston, London 1980. 134 pp., figs., tables. Price Dfl 60.-.

This book is a re-issue in book form of a collection of papers published earlier in *Vegetatio*, and read at the second international symposium of the working group on succession research on permanent plots, held at Yerseke, The Netherlands, October 1-3, 1975. The volume consists of 15 papers and a preface by the editor.

In his preface Beeftink briefly discusses the present state of research on vegetation dynamics, pointing out the various possibilities for investigations in the near future; he also traces the history of the working group, showing that it is very much alive and active, while the remainder of the book shows that the working group's activities are scientifically rewarding. Beeftink states that in Western Europe most of the detailed studies on vegetation dynamics are carried out in The Netherlands. The present book strongly underlines this statement, since ten of the 15 papers are written by Dutch scientists. It is not surprising that a large number of these Dutch studies concentrate on coastal vegetation types, since these are the most important among the few types of natural and semi-natural vegetation which have still survived in any substantial quantity the heavy population pressure in The Netherlands. The Dutch papers on coastal vegetation deal with macrophytic as well as algal vegetation, and discuss research methods as well as actual results of studies on the dynamics in pattern. Other papers include a brief general survey of photographic techniques, a discussion on the possibilities for ecological research offered by sampling permanent quadrats and by repeated detailed mapping of small areas, and papers on tree fall as a dynamic factor in a primeval Polish forest, effects of various management techniques on mediterranean garrigue, the ecological requirements of some relict species in Hungary, changes in nitrogen availability in old field successions. Ten papers are in English, five in German and one in French, all of them with English summaries.

M. J. A. WERGER

S. J. CASPER & H.-D. KRAUSCH: *Süßwasserflora von Mitteleuropa*. Band 23. *Pteridophyta und Anthophyta*. 1. Teil: *Lycopodiaceae bis Orchidaceae*. Gustav Fischer Verlag, Stuttgart, New York, 1980, 403 pp., 109 figs. Price DM 86,- (or DM 78,- by purchase of the second part).

Notwithstanding its title the present book covers all Pteridophyta and Monocotyledons in the whole of Europe which grow in water or in wet habitats. Apart from the rather small, handy size it looks very similar to *Flora Neerlandica* in its elaborate taxonomic descriptions and other contents; incidentally, the text of the genus *Baldellia* is nearly a literal translation of that in part I, 6 of that Flora. On the other hand the description of the vegetative parts of the plants are more elaborate, and it is easy to notice that much detail is based on living material, making these descriptions very valuable for workers in the field. When possible, vegetative characters are given in the keys, enabling determination of vegetative material. Valuable are also the numerous critical taxonomic remarks. Literature reference and an alphabetical index of the plant names will be published in the second part, which will be numbered 'Band 24'. Users of the book are thus forced to buy also that volume, thus spending about DM 160 for the whole work. Considering that high price, the good and detailed figures should have been reproduced with much more care. With that provision one can only impatiently await the publication of the second part. Undoubtedly it is a very useful standard work that every (Dutch) worker on aquatic botany should use.

R. VAN DER MEIJDEN

D. W. RAINS, R. C. VALENTINE and A. HOLLAENDER (Ed.): *Genetic Engineering of Osmoregulation. Impact on Plant Productivity for Food, Chemicals and Energy*. Basic Life Sciences, vol XIV. Plenum Press, New York 1979, 381 pp. Price \$ 47.40.

This volume of the important series 'Basic Life Sciences' is based on a symposium entitled 'Genetic Engineering of Osmoregulation: Impact on Plant productivity for Food, Chemicals and Energy', organized by D. W. Rains and R. C. Valentine and supported by the National Science Foundation and the Department of Energy (USA). Geneticists, physiologists, biochemists and molecular biologists were brought together to discuss the status quo in osmoregulation, especially with respect to the resistance of plants to salinity, cold and drought, and in view of a bright future where recombinant DNA techniques and manipulations with *in vitro* cultivated cells and tissues may be used for the genetic improvement of plants.

As it is recognized that a thorough understanding of the molecular mechanisms of osmoregulation and the regulation of their activity, is a necessary prerequisite for their genetic engineering, the book is almost entirely devoted to these aspects. Two sections, each consisting of three separate papers, deal with resp. osmoregulation in prokaryotic microorganisms and osmoregulation in eukaryotic microorganisms. Important topics such as the overproduction of L-proline as the response of *Salmonella* to osmotic stress, the effect of electrolytes on growth of Bacteria and the use of selected mutants in such studies are presented in a clear and easily comprehensible way. Special attention is paid to the osmoregulation of halophytic algae (*Dunaliella* and *Astromonas*). In a panel discussion on the molecular biology of osmoregulation by microorganisms, which concluded these two sections, future experiments are discussed and strategies developed how to solve present problems in osmoregulation research.

In two more sections, entitled 'Osmoregulatory mechanisms in plants' and 'Mechanisms of drought and cold tolerance in plants', a great variety of subjects is presented, including the role of organic solutes in osmoregulation, the response of the photosynthetic carbon metabolism to osmotic stress, energetic aspects of ion transport, membrane dynamics, osmoregulation during drought. Also here the present status of these research areas is explained clearly and in detail.

A rather small and in view of the pretentious title too small part of the book is devoted to the question how to breed plants with better osmoregulation. In addition to classical breeding methods also the application of tissue culture is explained. Since it appears that the response of plants to osmotic stress is rather fundamentally cellular it should be possible to select stress resistant cells or protoplasts out of immense numbers of normal cells and regenerate these cells into complete stress resistant plants, provided that the mechanism of plant generation from isolated protoplasts and *in vitro* cultivated cells is better understood and the procedures are applicable to the majority of the important crop(plants).

In conclusion: the book is a rich source of information on the problem of osmoregulation; especially for tissue culturists looking for applications in plant breeding of their new exiting developments.

P. A. Th. J. WERRY

E. A. BELL and B. V. CHARLWOOD (Eds.): *Encyclopedia of Plant Physiology, New Series Vol. 8: Secondary Plant Products*. Springer Verlag, Berlin-Heidelberg-New York, 1980, Cloth. Price DM. 198,- (approx. US \$ 110.90) ISBN 3-540-09461-X

This authoritative and comprehensive volume brings up to 1980 the literature survey on the most important classes of secondary plant products. One only has to skim through this book to realize the magnitude of successful identifications of organic molecules in microquantities during the last decades. In the original bilingual edition (which appeared in 1958) emphasis was laid on the terpenoids and plant phenols, while the alkaloids were omitted. This new volume gives a more balanced picture with relatively more attention to nitrogenous secondary metabolites. Of the 20

authors only T. W. Goodwin contributed to the original volume. Most of them are well-known authorities on their topics. Their well-prepared papers are arranged in two sections.

The first (botanical) section starts with a masterly historic introduction written by the old maestro in secondary metabolism K. Mothes. The possible phylogenetic and ecological significance of these constituents are very (too?) concisely discussed by E. A. Bell in the second chapter. The coordinate gene expression and control in secondary metabolism under the influence of intrinsic and extrinsic factors in bacteria, fungi and higher plants are extensively discussed by M. Luckner.

The second section places a major emphasis on the chemical aspects of these plant products. The first 100 pages of chapter 4 represent an account of the present state of knowledge on the rather complex field of alkaloids. For the non-specialist this part is sometimes difficult to understand and deteriorates several times in a bewildering array of structural formulas and chemical names. The final part of this chapter is concerned with a clear review of the widely dispersed literature on the isoprenoid alkaloids.

The various types of isoprenoids, mixed terpenoids, plant amines, non-protein amino acids, cyanogenic glycosides and the sulphur containing glucosinolates (thioglucosides) are obligatory subjects in this book, as is the masterly review on plant phenols such as we have to come to expect from Harborne. The most important plant in this chapter is *Hevea brasiliensis*: due to the economic importance of polyisoprenes 20 pages are devoted to the latex of this natural source of rubber. The final chapters are dealing with plant lipids and carbohydrates with special reference to taxonomic relevance.

The editing is good and the papers, generally, are interesting, providing a good summary for the subjects covered. The dramatic increase of knowledge on secondary plant products only permits a concise review on the various subjects. The space allocated to some subjects appeared to be too small and this may have a negative influence on the readableness of some chapters. In order to arrive at a balanced picture within the restraints imposed, the reader is referred frequently to detailed reviews and the 3000 references account for an essential part of this single pool of information on secondary plant products. One gets the impression, however, that the authors did not know exactly each others contributions. It is a little disappointing that a number of compounds which are mentioned in the first (botanical) section do not return in the subsequent (chemical) chapters. At best the reader is referred to the references. In addition, it is a pity that compounds as e.g. aflatoxins, trisporic acids, phytotoxins, macrocyclic antibiotics and many compounds which are commonly known collectively as 'secondary metabolites derived from acetate' are not or hardly mentioned in this volume.

The comments above notwithstanding and in spite of the unevenness characteristic of books with many authors, the text is a worthwhile record of the multitude of secondary metabolites in the plant kingdom. The price of the book will keep it out of reach of those who will want to possess it. However, this beautifully organized volume of the encyclopedia of plant physiology is a must for scientific libraries.

H. W. GROENEVELD

R. BOVEY, W. GÄRTEL, W. B. HEWITT, G. P. MARTELLI and A. VUITTENEZ: *Maladies à virus et affections similaires de la vigne; atals en couleurs des symptomes. Virosen und virusähnliche Krankheiten der Rebe; Farbatlas der Symptome. Virus and virus-like diseases of grapevines; colour atlas of symptoms*. Editions Payot Lausanne – La Maison Rustique Paris – Verlag Eugen Ulmer, Stuttgart. 1980. 181 pp. 186 photographs in colour, 1 table and index. DM 58.

Viruses increasingly attract attention as incitants of abnormal plant growth, and reduced crop yield and quality. Vegetative propagation, for instance of grapevine, renders cultivars of such corps especially vulnerable to degeneration by accumulating virus infections

The present book has been written by reputable virologists from five important countries producing wine and grape. It presents a splendid survey of the effects of viruses on the grapevine. Such effects (disease symptoms) range from hardly noticeable changes in leaf colour to bright chlorosis or

golden yellowing, either involving whole leaves or occurring in characteristic patterns, from slight reductions in growth to severe stunting or plant death, and from various abnormalities in shape to peculiar outgrowths or enations. Several of these effects are hard to distinguish from disorders caused by mycoplasmas, rickettsias, genetic aberrations or mineral deficiencies.

The illustrations in colour constitute the major part of the book. There are three short explanatory chapters with some information on the viruses and their ways of transmission, and on the causes of virus-like diseases. All texts and captions have been printed in French, German and English.

The book is especially meant for crop protectionists to assist them in visual diagnosis of diseases in the field, to help them in distinguishing the virus diseases from virus-like disorders, and to help them in testing propagation stock for virus freedom, for instance by absence of specific reactions on selected *Vitis* species used as indicators. The publication is also of interest to plant physiologists and nutritionists in helping them better to comprehend the wide variety of causes of abnormal plant growth and development, and to appreciate more fully the role of viruses.

L. Bos

J. HESLOP-HARRISON: Aspects of the structure, cytochemistry and germination of the pollen of rye (*Secale cereale* L.). 1980. 47 pp., 18 plates. Supplement no. 1 to *Annals of Botany*. Academic Press Inc. (London) Ltd. U.S.\$ 18.00.

This memoir, the first of a series of supplements to the journal *Annals of Botany*, combines under its modest title a review of past research with a detailed discussion of the author's original work on structure and functioning of grass pollen, mainly that of *Secale*. It is packed with so much new information that a short review can hardly do justice to it.

Wall structure is interpreted in conventional terms of exine and intine, but between these two layers a non-acetolysis resistant Z-layer is recognized, contiguous with the apertural 'Zwischenkörper'. Curiously, this latter term, originating from Fritzsche (1837) is preferred above its English translation as interstitial body by Beer (1905) or the more modern term oncus of Hyde (1954).

The thin extra-apertural exine allows for communication via micropores, but its cavities receive only a limited amount of tapetal-derived material and appear largely empty on TEM graphs. As is to be expected from a wind pollinated plant, there is no lipid coating on the exine surface. The main function appears to be mechanical containment during volume changes.

The description of the cytoplasm of the vegetative cell and an analysis of the processes taking place here by a broad scale of cytochemical and other methods, form the main part of the study. The key processes of hydration and germination and the interaction between cytoplasm, intine and Zwischenkörper are followed in great detail with light, fluorescence and transmission electron microscopy and with time-lapse photography. By careful manipulation the author has succeeded in taking the pollen grains apart, resulting in remarkable photomicrographs of so-called intine ghosts, showing previously undetected radiating structures centred on the pore.

The critical physiological transition is from an open, leaking system to an osmotically contained one and, to achieve this, the trinucleate grass pollen grain appears to have become an automaton, fully programmed and equipped with all the systems required for germination and pollen tube growth.

However, the price to be paid for this is a short life, due to the lack of stabilizing systems which could preserve the capacity of the membranes to recover their normal permeability upon hydration over longer periods. The contrast with long living pollen grains, such as those of *Pinus*, invites further investigation.

Pollen tube growth is also discussed and appears in *Secale* to be more dependent on reserves present in the grain than is the case in *Lilium*, where pollen tubes feed on stylar tissue.

This paper clearly shows the rewards for concentrated study of a self-contained system. It forms a bench mark for future studies in this promising field, is of interest to physiologists, cytologists and agricultural research workers alike and should be mandatory reading for all pollen morphologists who are wont to concentrate their research efforts on the acetolysed exine skeleton only.

J. MULLER

M. ZOHARY, C. C. HEYN and D. HELLER: *Conspectus Florae Orientalis*. An annotated catalogue of the flora of the Middle East. 1980. Published by the Israel Academy of Sciences and humanities, Jerusalem. Fascicle I: Papaverales: Papaveraceae – Moringaceae; Rosales: Platanaceae – Neuradaceae. xiv + 107 pp., 2 maps. Price US \$ 16.00.

Though in many of its parts the climatic conditions are somewhat adverse to plant growth, the Middle East harbours an enormous number of genera and species, second to few other non-tropical areas of the world. A very large body of data pertaining to these plants has accumulated since the publication of such comprehensive works as Boissier's monumental *Flora Orientalis*, now almost a hundred years old.

The authors of the present work have taken onto themselves the enormous task of producing a list of all vascular plants known from the area, here circumscribed a bit more narrowly than in Boissier's work, i.e., comprising the Middle East from Egypt and the East Aegean Islands to Arabia (including the tropical parts of the Peninsula) and Iran; Afghanistan and Soviet Asia are excluded. Important synonyms are cited, as are basionyms and infraspecific names in current use. The distribution is cited for the entire area; all countries are subdivided into natural districts given by a code of abbreviations which are easily spotted on a map at the end. The general phytogeographical category is also stated for each taxon, endemics being cited as such. Thus, the work constitutes much more than a – by itself already most valuable – critically compiled nomenclator; it contains a wealth of phytogeographical data available now, so to speak, on a platter.

Introduced neophytes are included, if they are of any importance. The sequence of species is alphabetical, of families and genera according to a 'natural' arrangement taken from Engler's 'Syllabus der Pflanzenfamilien' (1964 edition). Perhaps an alphabetical sequence of genera too, would have been easier to use.

The labour invested in the compilation of this catalogue can only be fully appreciated by someone who actually tried to assemble reliable data on distribution from the enormous amount of literature to be scanned, where information often appears under the most diverse names (synonyms), is not rarely contradictory, and may be based on misidentifications and other errors. Such errors seem to have been stamped out in a most admirable way.

The experienced team in Jerusalem who did the job are to be congratulated on the outcome. It may only be hoped that political considerations will not curb the widespread use of this indispensable work in the area where it is needed most: The Middle East; also, that we shall not have to wait for too many years to see it completed. Eventually a round 200 families will have to be reviewed; how many thousands of species is anybody's guess.

K. U. KRAMER

A. RIETH; *Xanthophyceae*, 2. Teil. In: H. ETTL., J. GERLOFF and H. HEYING, *Süßwasserflora von Mitteleuropa* (begründet von A. PASCHER), Band 4. Gustav Fischer Verlag, Stuttgart, New York, 1980, 147 pp., 61 plates (including more than 500 separate figs.). Price: DM 68.—.

This second volume of the 'new edition' of Pascher's famous *Süßwasserflora* is devoted to the taxonomy of *Vaucheria* and the monospecific genus *Asterosiphon*.

Actually, this 'new edition' is an entirely new and up to date treatment of the taxonomy of freshwater algae of Europe and largely also outside Europe, and only the format recalls Pascher's classical work. The first volume appeared so far (by Ettl, on *Xanthophyceae*) and this new volume are of very high standard.

If the editors will succeed in publishing the 23 volumes planned and in maintaining the same high standard, this rejuvenated *Süßwasserflora* will certainly serve as the basic work for the identification of freshwater algae in the forthcoming decades.

Rieth's work consists of a general part and a special part. The general part contains sections on

delimitation of the *Vaucheriales*, morphology, cytology, life-history, ecology, cultures, parasites and the taxonomic criteria used for the distinction of sections and species in *Vaucheria*. The special part contains keys to the 12 sections and the 40 European species of *Vaucheria*, as well as their descriptions, unfortunately with the exception of the purely marine species.

The unique feature of this truly monographic treatment of the genus *Vaucheria* for Europe is the fact that it is entirely based on the author's original investigations of living natural populations and cultures derived from them.

Most taxonomic works of this type are – often necessarily – at least partly literature compilations, or at least partly based on preserved material.

The excellent descriptions and numerous equally excellent line drawings give due attention to infraspecific variability and interspecific morphological overlaps. In prof. Rieth's opinion these aspects can only be adequately studied in living populations. I think it is a pity that the limitation of the series to 'freshwater algae' did not permit the inclusion of descriptions and figures of the 8 purely marine European species (which are, however, fortunately included in the keys).

I can feel sympathy for prof. Rieth's rejection of long forgotten species-names having unfortunately priority over current well-known names according to the rules of the International Code of Botanical Nomenclature. Such nomenclatural changes are always in conflict with desirable stability in taxonomy. None the less I think this decision is highly regrettable, as many other investigations, rightly considering the Code as an international treaty to reach nomenclatural stability, will use the older names if these are based on indisputable type specimens. Thus Rieth promotes nomenclatural confusion in *Vaucheria* rather than the desired stability. Fortunately such recent nomenclatural changes are given in brackets after each name preferred by Rieth. It would have been of much help if the references would have been added in which these nomenclatural alterations were proposed. Apart from the above objections to Rieth's nomenclatural solution, I consider the present work as an exemplary contribution to monographic algal taxonomy.

C. VAN DEN HOEK

H. J. HUMM and S. R. WICKS: Introduction and guide to the marine bluegreen algae. Wiley, New York, Chichester, Brisbane, Toronto, 1980. 194 pp. 34 figs. Price: £ 12.50.

This book is primarily intended as a guide to the identification of the marine blue-green algae following the recent monographs of F. Drouet but also allowing identification by the older taxonomy. It consists of three parts. The first part, the introduction, contains short general chapters on topics such as classification, growth form and morphology, cytology, genetic recombination, nitrogen metabolism, nitrogen fixation, the cell wall, the sheath, motility, reproduction and dissemination, heterocysts, gas vacuoles, cyanophages, distribution in the sea, etc. In these short general chapters recent literature data are taken into consideration. In some chapters arguments are given for the choice of the Drouet classification.

The second, main part ('Cyanophyta') contains keys and descriptions according to the Drouet classification, according to which there are 34 marine species.

The third part ('Appendix') comprises keys and descriptions according to the older taxonomies. Table 2 (p. 168–171) indicates with which Drouet-species the older species should be synonymized, pages 173–176 present a glossary.

The crux of Drouet's classification is his hypothesis that the Cyanophytan species is highly polymorphic and embraces many extremely divergent, purely phenotypic growth forms ('ecophenes') as responses to divergent environmental conditions. If this species concept would appear valid than the Cyanophyta would constitute quite an exceptional group of organisms. Testing the validity of Drouet's hypothesis is apparently instrumental to adopting his taxonomy.

Contrary to the opinion of Humm and Wicks, Drouet did not test the validity of his hypothesis by culture methods (in the sense of repeatable and controllable experiments). They are, however, correct when they state that it is based on the study of thousands of collections (most of them dried); a type of approach which quite conceivably has led Drouet to the feeling that many different forms belong to

morphological continua.

Other investigations, not considered by Humm and Wicks, have tested the validity of Drouet's Cyanophyten species concept, using controllable and repeatable culture methods (for instance recent work of Nielsen and Stam) and the method of the DNA-DNA hybridization (recent work of Stam). The results of these researches, and of other recent experimental studies on the taxonomy of Cyanophytes (e.g. work of Waterbury) do not at all support the validity of Drouet's Cyanophyten species concept, thus underlining earlier criticisms on Drouet's work implying imprecision of observational technique. For instance, Drouet's polymorphic 'species' *Schizothrix calcicola* embraces species with subtle (or even obvious) morphological differences, but, even more so, with clear-cut genotypic differences.

Therefore the scientific foundation of Humm and Wicks' book and consequently its utility as an identification-work are unsound.

Of course we are in urgent need for a better Cyanophyten classification. However, this will have to be realized by a combination of careful fieldwork, culture methods and, if possible, microbiological methods. Fortunately a few good examples (work of Kann and Komarek, aspects of the work of Waterbury) show that this is in principle possible. For the time being we should recur, though with due critical attitude, to the classical monographs of Geitler, Tilden and Frémy.

C. VAN DEN HOEK

KELLMAN, M. C. – *Plant Geography*. Methuen, London and New York, 1980, 2nd edition, 181 pages, £4.95 (paperback) or £10.00 (hard cover).

This is a concise student text introducing the field of 'modern' plant geography as based on the concepts of population biology. Thus, its scope differs considerably from the traditional texts on plant geography used at Dutch universities (Good, Lam, Polunin, Schmithüsen, Straka, Walter, etc.), at least by its terminology.

Emphasis is on life strategies of species, environmental determination of potential species ranges and migratory opportunities rather than on the actual distribution patterns, and users of this book will in vain look for representative maps of species distribution areas. A smaller portion of the book is devoted to vegetations and focuses on structure and functioning as well as on methods in vegetation pattern analysis. Where vegetation classification and ordination are discussed, phytosociologists will find some familiar criticism on the Braun-Blanquet approach spelled out. A closing chapter on plant geography techniques draws attention to the feasibility of experimentation in plant geography, but examples only refer to field experiments (e.g. transplantation, artificial seeding, habitat alteration) and not to laboratory work such as diaspore germination experiments.

The English is very concise and technical, and sometimes almost incomprehensible by lack of adequate illustrative material. References are mainly to studies on flora and vegetation of the New World. For Dutch students this book, though inexpensive, is therefore hardly to be recommended.

S. R. GRADSTEIN

R. P. LABADIE (ed.): *Plantaardige geneesmiddelen in de gezondheidszorg*. IX + 179 pp. ISBN 90 313 0376 3. Scheltema en Holkema BV, Utrecht 1980. Price Dfl. 34.50.

Plantaardige geneesmiddelen in de gezondheidszorg (Vegetable medicine in health care) is a collection of papers presented at the fifth Symposium on Pharmacognosy, held in Utrecht, The Netherlands, November 24, 1978. As a result the tempting title covers a number of highly sophisticated subjects, which are for the greatest part incomprehensible to the layman. Besides 11 Dutch contributors there are 5 from Belgium, 3 from Germany and 1 from Sri Lanka.

Most reports are technical descriptions of isolation, separation, and analysis of therapeutic compounds from promising medicinal plants. However, attention is also paid to the formation of

secondary metabolites in plant cell cultures, to Ayurveda medicine and to Homeopathic use of plant extracts. Noteworthy is the paper devoted to the pharmaco-therapy of purified vegetable compounds as opposed to complex preparations. The laymans' philosophy "back to nature" appears to be not always in conflict with scientific conceptions.

All together the booklet contains besides the technical reports, an amount of information comprehensible to the less advanced reader who is interested in medicinal plants and herbal medicine.

One wonders why the proceedings of the meeting have not been written in an international language to make it accessible to a wider public.

G. STARITSKY

T. K. SCOTT (ed.): *Plant regulation and world agriculture*. NATO advanced study institutes series: Series A, Life Sciences Vol. 22. XI + 575 pp. ISBN 0 306 40180 0. Plenum Press, New York-London 1979. Price U.S. \$ 47.50.

"Plant regulation and world agriculture" are the proceedings of a NATO advanced study institute on plant regulation and world agriculture, held in Izmir, Turkey, September 21-30, 1978. There were 68 participants, 28 from Turkey and 40 representing 14 other countries. Object of the study institute was to bring together, from basic science, criteria for the enhancement of plant production needed to sustain the human race by the year 2000. In addition to purely scientific approaches, participants from industry showed their possible contribution to the solution of the problem.

The main body of the book consists of 26 accounts on "Plant growth regulation and agricultural improvement techniques". The subject is divided in three sections: (1) Biologically based, (2) Chemically based and (3) Physically and Environmentally based. The second part of the volume is devoted to "Planning for the future" which contains only two contributions. Comprehensive author, plant name and subject indices at the end of the book are very convenient to the reader. In addition, a list of participants to the conference is included.

The meeting of Izmir is the successor of two previous NATO conferences at the same location pertaining to plant growth regulation. As a result plant hormones and growth regulators still play the leading part in the majority of the papers. Attention is given to their action in a wide range of physiological processes, to the chemistry and identification of new, as well as known plant growth substances and their relation to productivity, growth retardation and herbicidal activity. Other topics are in the field of plant breeding, genetics and tissue culture.

The technical reports in the first part of the book are clearly written by leading specialists and are mainly based on their own research and experience. Consequently not all aspects of "plant regulation" are included. As could be expected from pure scientists, the authors' message is in general a demand for "more research" and they do not give practical recommendations for the development of an agricultural strategy.

In the last chapter, partly in the form of a discussion, prospects are given for the application of growth regulators in agriculture. The possibilities of an application in the field are concentrated on advanced agricultural systems as are found in Turkey and other countries of the North-Western hemisphere.

Theoretically there are new possibilities but the introduction in practice is still problematic, even in the areas mentioned above. Most farmers lack the knowledge for proper use of growth regulators. Moreover the industry can not afford the high costs of development of new agro-chemicals in the next few years. Apparently, in the near future, there is more to gain by other agricultural measures than by the application of growth regulators in the field.

However, the prospects of the use of growth regulators in crop improvement techniques, for instance tissue culture, are far more positive. Moreover it is the opinion of the reviewer that they have a more world wide impact on agriculture than application in the field.

As can be concluded from reading the review, the book is very useful to all interested in growth regulators and their possible application in agriculture.

G. STARITSKY

J. REINERT (editor): *Chloroplasts*. (Results and problems in cell differentiation (W. Beerman, W. J. Gehring, J. B. Gurdon, F. C. Kafatos, J. Reinert (editors); vol. 10) Springer-Verlag, Berlin-Heidelberg-New York, 1980, 240 pp., 40 figs. Price cloth DM 78.— (approx. \$ 46.10). ISBN 3-540-10082-2.

Results and Problems in Cell Differentiation is the title of a series of topical volumes in developmental biology. Its volume 10, *Chloroplasts*, presents a considerable amount of information not only concerning this type of plastid, but also some details of research on the properties of proplastids and etioplasts are described.

Eight articles compose this volume. The main topics are: the development and interconversion of various types of plastids, the relation between cell division and chloroplast division as well as accessory chloroplast divisions unrelated to cell division, structure and function of plastid DNA as well as the plastome and the genome/plastome interaction, RNA and protein synthesis during plastid differentiation, the biosynthesis of thylakoids and membrane-bound photosynthetic enzyme systems, various factors influencing chloroplast differentiation, many data concerning fraction I protein as well as both its large subunit and its small one, and phenomena observed in isolated chloroplasts, such as possibilities of survival, plastid division and protein synthesis.

In these articles extensive reviews are presented in quite an instructive way. A large number of references enables those who are interested in the pertaining fields to collect more detailed information. Difficulties concerning correct interpretations of results obtained by different methods are discussed. Attention is paid to other methodical aspects as well. A large amount of data regarding genetic, functional, and structural studies is supplied, whereas it is not only mentioned that future research is needed for better understanding in certain cases, but also the way in which this research could be carried out is indicated. In this respect it may be remarked that combined studies of chlorophyll spectra and composition of the carrier molecules in pigment-protein complexes, in order to get more insight into the structure of the photosynthetic apparatus, could have been suggested as well. However, the considerable amount of most interesting studies and results, as well as the various proposals for future research render this volume most recommendable to those interested in the genetics, structure and functioning of chloroplasts.

J. B. THOMAS

V. H. DROPKIN. *Introduction to Plant Nematology*. John Wiley & Sons, New York, Chichester, Brisbane, Toronto. 1980. 293 p. Dfl. 77.00.

Recently quite a few specialised books on nematology have appeared, indicating the rapid progress made in this field. However, books giving basic information are still urgently needed.

Dropkin has helped to satisfy this need with this lucidly written "Introduction to Plant Nematology". the first five chapters of the book deal in an efficient and pleasant way with classic topics such as structure, biology and environment; procedures for isolation from soil and plant tissues, preservation and identification of plant parasitic nematodes. Chapter 6 describes the principles of diseases caused by these nematodes and covers morphological and physiological changes and adaptations in the plant infested by surface feeders, migratory endoparasites and sedentary nematodes. Nematode-induced feeding sites are shown in beautiful scanning electron micrographs. The book stresses physiological changes in the plant after nematode infection, the effects of minerals and the consequences for secondary invaders such as fungi and bacteria. The next two chapters describe the diseases and symptoms caused by different nematode species and chapter 9 describes associations between nematodes, fungi, mycorrhizae and viruses. Examples are well chosen and include the major tropical diseases. Chapter 10 discusses genetic and other forms of resistance of plants and Chapter 11 population dynamics of plant-parasitic nematodes in a simple and easily understood way. Control of nematodes is logically described: hygiene, crop rotation, organic soil amendments, biological control (not easy to handle), nematicides and their use, and forms of integrated control. The last chapter – prospects for the future – emphasizes the need for more

ecologically oriented research, for more knowledge of biochemistry and physiology of nematodes in order to find new forms of chemotherapy based on physiological differences between plants and nematodes. It also stresses the idea that many nematode-incited diseases are the result of interactions of genes of the host and of the parasite. References at the end of every section are well chosen, indicating the author's thorough knowledge of the literature. Prof. Dropkin succinctly summarizes classical plant nematology and trends, and brings out physiological and ecological aspects of both nematode and host plant. Introduction to Plant Nematology is essential reading for undergraduates in plant nematology and is also highly recommended for those interested in plant pathology, plant/animal relationships or soil biology.

F. J. GOMMERS

W. LARCHER: *Physiological Plant Ecology*. Springer-Verlag, Berlin-Heidelberg-New York, 1980, 303 pp., 193 figs. 47 tab. XVII. Soft cover DM 59,—; approx. US \$ 34.90.

This book presents a well-balanced combination of basic physiological mechanisms and functional relationships in the soil-plant-air continuum. The various levels of organization are treated in chapters on energy exchange, carbohydrate balance, mineral balance and water balance. The combined treatment of irradiation and temperature in one chapter is an improvement compared with the first edition which makes, together with other improvements in detail and the up-to-date replenishment of the comprehensive list of references this book an invaluable guide for all those interested.

Those, who are involved in teaching Ecophysiology in University classes are familiar with either the original paper-back "Ökologie der Pflanzen" or the English translation "Physiological Plant Ecology" and will have noticed the merits of this paper-back. Unfortunately for students the price of the English translation is rather high.

R. BROUWER

G. KUNKEL, *Die Kanarischen Inseln und Ihre Pflanzenwelt*, Gustav Fischer Verlag, Stuttgart-New York. 1979. X + 185 pag. 74 fig., 13 maps. DM 36.—.

Kunkel's book is a summing up of his botanical experiences during the 13 years he lived in the Canary Islands. Botany enjoyed an upsurge there during that period and Kunkel contributed significantly.

He is commemorated by the endemic genus KUNKELIELLA (Santalaceae).

The author aims at a synopsis of the present day knowledge of Macaronesian plant taxonomy, plant geography, plant ecology, plant sociology and conservation against a background of general information on the archipelago's geography, geology, climatology, demography and economy. A tremendous task for a book of not even 200 pages.

Kunkel succeeds in conveying the general picture of the subjects listed and some of their interrelations. He works by means of examples and is never comprehensive. Therefore the botanist looking for facts may feel short changed on the subject but he is likely to find a reference to the literature. The botanically interested tourist will find much of interest but may be rebuffed by much technical abstraction.

As such the book is rather unbalanced and it does not compile modern literature comprehensively.

It is not easy to extract Kunkel's original contributions. The book contains several interesting suggestions that one would wish to have been discussed more in depth: his map of the Macaronesian area includes SW-Portugal, an original view, but no reasons for this are given.

In an appendix several valid new combinations are made: *Apollonias barbuiana* spp. *ceballosi*, *Limonium brassicifolium* spp. *macropterum*, *Monanthes laxiflora* var. *chlorotica*. The genus *Megalonium* is proposed to accommodate *Aeonium nobile*. But his new names in *Limonium*, *Aeonium* and *Ophrys* are invalid for various reasons. The genus *Ceballosia* is proposed as intended to accommodate

Messerschmidia fruticosa, but in the form the protologue is printed *Ceballosia* proves to be a superfluous name for *Heliotropium* L., a regrettable nomenclatural burden.

Kunkel's book is well produced, but many of the colour photo's are poor.

D. O. WIJNANDS

V. D. ALEKSANDROVA: *The Arctic and Antarctic, their division into geobotanical areas*. Cambridge University Press, Cambridge 1980. XII + 247 pp. (190 pp. text, 75 pp. references and indexes), 23 figs., 1 table. Price £ 15.00. ISBN 0 512 23119 1. (Translation by Doris Löve from the Russian publication from 1977, based on a lecture presented in 1974.)

Aleksandrova's work presents an extensively documented, comprehensive division of the polar regions into geobotanical areas at five successive levels. This is based on a hierarchy of ecological-physiological principles, e.g. zonal aspects, life-forms, phytogeographical, structural and pedological characteristics. The vegetation of the polar areas is reviewed using the same principles.

As the state of our knowledge on the botany of the polar areas still is unbalanced and rather fragmentary the present survey is very useful. It also gives an authoritative impression of current views among Russian botanists and discloses a rich source of literature on the Eurasiatic North. Also for that reason it certainly deserved translation.

The absence of point by point summaries of the definition, order, and factual content of the applied criteria is regrettable.

The text varies in consistency, especially where details on the regions and districts are concerned. The bibliography is almost entirely limited to Russian and English publications, with unfortunate omissions.

A glossary would have been very informative for non Russian botanists.

The work can be recommended as reading for generally interested botanists and plant geographers. Those interested in more details and a more elaborated systematic approach will find it somewhat disappointing (and rather expensive), hardly offering new views, but instead quite an amount of future homework.

J. G. DE MOLENAAR

Comment on the transliteration: The translator, Doris Löve, applied for the transcription of Russian personal names in the text a system by G. RAZRAN (*Science* 129 (1959): 1111–1113) which has its merits if transcription is in quest, but wrongly was labelled transliteration. She has based the transliteration of the Bibliography on the same system. However, a transliterated bibliography is only efficient if its "codification" is identical with that of the catalogues of leading libraries, i.e. conforms to the International Standard. The valid edition of this Standard is: "Recommendation ISO/R 9 for the Transliteration of Slavonic Cyrillic characters" (2nd ed. 1968; also issued in French and in Russian). It is obtainable through the Institutes of Normalization in every country.

M. J. A. BOTERENBROOD

F. ROSE: *The Wild Flower Key, British Isles – N.W. Europe, with keys to plants not in flower*. Fred. Warne Publ., London. 1981. 480 pp. 1000 figs. Price: Limp Ed. £5.95, Cased Ed. £8.95 net.

This flora is meant to be "a guide to plant identification in the field, with and without flowers". It covers the British Isles, France N. of the river Loire and W. of the Vosges, the Northern half of Western Germany (G.F.R.), Luxemburg, Belgium, the Netherlands and Denmark (except the Faer Øer and

Greenland). It is not a complete flora, however. Only 1450 species are mentioned, over 1400 fully described and about 1000 illustrated (in colour). No subspecific taxa are mentioned. Emphasis is laid upon British plants. All the native as well as long-established introduced species of flowering plants of the British Isles have been dealt with, with the exception of many grasses, sedges and rushes and/of critical groups such as *Alchemilla*, *Rubus*, *Euphrasia*, *Taraxacum* and *Hieracium*. Only few Pteridophyta have been included. The author has omitted all neophytes and adventitious plants, as well as the non-British species which are rare in the continental area covered.

Nomenclature mainly follows Clapham, Tutin and Warburg (2nd ed.) and author's names have therefore been omitted. English names, however, have been added throughout the book, as the author intended to compile a "popular flora". In spite of the word "compile" the keys are all by the author and do contain many original characters or ways of splitting up.

There are successive keys to the families, to the genera and for the larger genera to the species, all based upon both generative and vegetative characters. In addition there are keys based exclusively upon vegetative characters. That is something quite new, which I have been waiting for over fifty years. And I am certainly not the only one. It is a long felt desire of many plant ecologists, plant sociologists, plant geographers and florists to have such a flora.

Nearly all species are accompanied by a concise, but very characteristic description, a colour drawing of the plant and some details of flower or fruit, as well as data on distribution ecology and flowering time. An index to keys and an index to species (British and Latin names) concludes this flora.

In view of the many excellent modern floras of Britain, Belgium, the Netherlands and Denmark one may ask what is the use of another flora of this area. As to Britain I suppose it will fill a need in spite of the excellent floras already existing in Britain. These, however, do not give keys based on vegetative characters. They are hardly illustrated or too voluminous to carry in the field. This flora is of a handy size and weight. What is more, the keys in this flora are largely original, excellent and easy, since frequent use has been made of good vegetative characters, also in the keys for flowering specimens. In addition the many beautiful drawings which are usually very accurate both regarding form and colour of the plants, must be a great help for the student. Although rather small, they are full of detail. Yet one might wish them a bit larger, especially the drawings of flowers and fruits. It was an excellent idea of the author to add a scale to each figure (usually 1 cm, if not mentioned otherwise). The illustrated glossary of botanical terms, the introduction to flower morphology and the hints how to use the book add considerably to the efficiency of its use by beginners.

It is to be regretted that there are no keys to the species of all genera. It is also a pity that so many even common and characteristic graminoid plants are lacking, for instance *Schoenus* and *Corynephorus*. As said before, only few Pteridophytes have been included. But the choice seems rather arbitrary: why is *Equisetum* lacking completely and is *Dryopteris* present, *Athyrium* not? Why is *Blechnum* included, *Polypodium* not? To my mind it would have been better to leave out all Pteridophytes.

The main value of this book should lie in the vegetative keys. Unfortunately my initial joy was somewhat damped after careful examination. The first division is according to eight major habitats. This seems very practical, but may give rise to difficulties with species occurring in two or three different habitats and with individual finds of a species in a habitat where it is normally lacking. Another problem is the shift in habitat preference from, say, Ireland to Western Germany or Eastern France. In Britain, inland sand dunes with *Corynephorion* and sea dunes with woods and moist valleys hardly exist. This is perhaps the reason why it is impossible to find species like *Corynephorus canescens*, *Spergula morisonii*, but also *Epipactis palustris* and *Centaureum littorale* under the heading "VIII Sand Dunes". Even species of dry open dunes like *Sedum acre*, *Cochlearia danica*, *Ononis repens* etc. etc. are lacking. Obviously the category VIII is meant to include only plants of the outermost maritime dunes. *Festuca tenuifolia*, to quote another example, can only be found in key III (Heathlands and Moors), and neither under heading VI (Dry Meadows) nor under VIII (Sand Dunes).

The choice of species per biotope often seems rather illogical. For instance, in the key "Chalk Grasslands" also non-characteristic species like *Dactylis glomerata* are mentioned, not, however, *Poa pratensis*, *Festuca pratensis* or *Arrhenatherum elatior*. On the other hand, typical chalk grassland species like *Poa compressa*, *Arenaria serpyllifolia*, *Saxifraga tridactylites*, and most amazing of all, *Potentilla tabernaemontani* (verna) are absent. Looking through the keys of shady hedgebanks one will find *Chaerophyllum temulum*, not *Conium maculatum*; *Rumex sanguineus*, not *R. obtusifolius*; *Poa trivialis*, not *Agrostis stolonifera* nor *Elytrigia repens*. Looking through the broadly conceived habitat "Road

sides, waste ground, well lit hedgebanks, arable and dry meadows" one finds that such grasses as *Nardus stricta*, *Festuca ovina* and *pratensis*, *Agrostis tenuis*, *Lolium perenne* and all *Poa*'s have been omitted.

Many species are absent from all vegetative keys, for instance *Cirsium dissectum*, *Geranium phaeum*, *Conopodium majus*, all *Silene*'s except *S. vulgaris*; *Samolus valerandi*, *Parnassia palustris* etc. etc. In the group water plants I searched in vain for *Luronium natans* and for submerged forms of *Sagittaria* and *Glyceria fluitans*. Yet, these examples show that the plants in question are often frequent to common species and not always difficult to recognize in sterile state.

In spite of this criticism it must be said that the flora by Francis Rose is a good pocket flora of non-graminoid flowering plants for Britain, especially if one has plants in flower at hand and if one is not interested in subspecific taxa. As to the vegetative keys, this first attempt in a difficult field must be welcomed and admired. It is only to be hoped that in a following edition all flowering plants, at least insofar as they can be identified without flowers, will be included in the vegetative keys. This is particularly to be hoped for non-graminoid plants, since we have already excellent floras of vegetative grasses and sedges of Britain at our disposal. Continental field botanists will eagerly await such an enlarged edition, too.

J. J. BARKMAN

R. BORNKAMM, *Die Pflanze, eine Einführung in die Botanik*, 2nd Ed. (Uni-Taschenbücher 114). 191 p., 105 fig., 15 tab. Eugen Ulmer, Stuttgart 1980, DM. 19.80.

The first edition of this introduction to botany was reviewed by Anker in *Acta Bot. Neerl.* 23 (1974), p. 751. The second edition has been updated and the chapters on germination and taxonomy have been extended; the illustrations have improved by the use of more advanced printing techniques.

The book is intended to give non-botanists a general idea of botany and for students in biology to fill the gap, apparently existing in Germany, between secondary school and university teaching. The textbooks for secondary school biology in The Netherlands, however, are in many respects at least at the same level as professor Bornkamm's treatise.

A few remarks may be made: on p. 29 the chromosome number is mentioned as a characteristic of every plant species; a reference to the genome mutations, treated on p. 123, would be welcome. A mention that the ratio between amylose and amylopectin in endosperm is not always 1:3, would not come amiss, especially for students in human nutrition. On p. 91 the reader is informed that only during the night the carbohydrates, formed by day in photosynthesis, are transported from the leaves to other parts – every aphid will know better.

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